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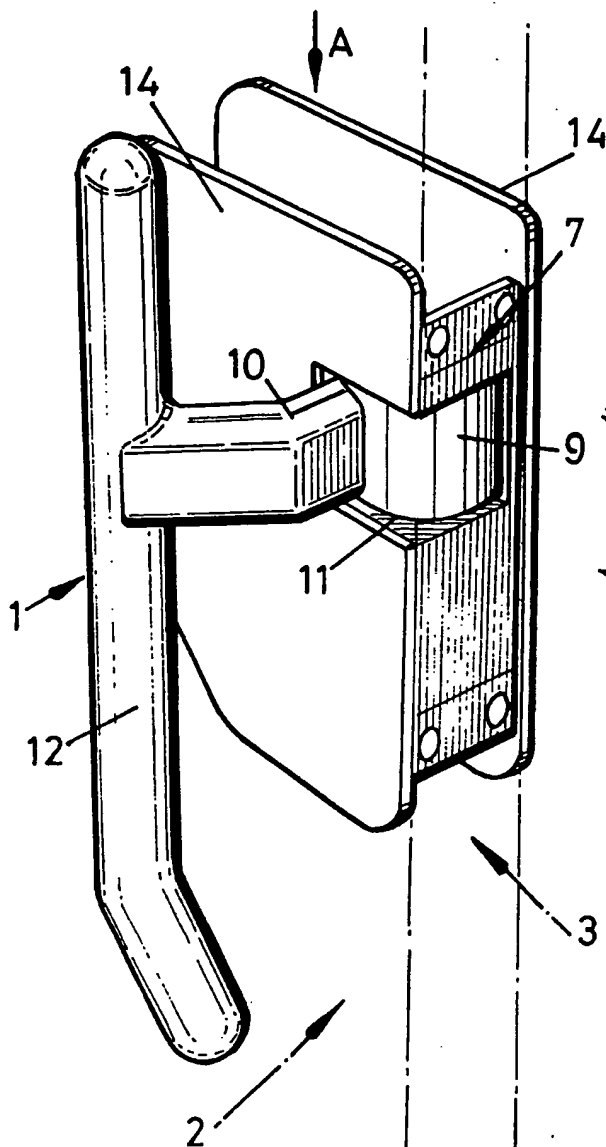


FIG. 1

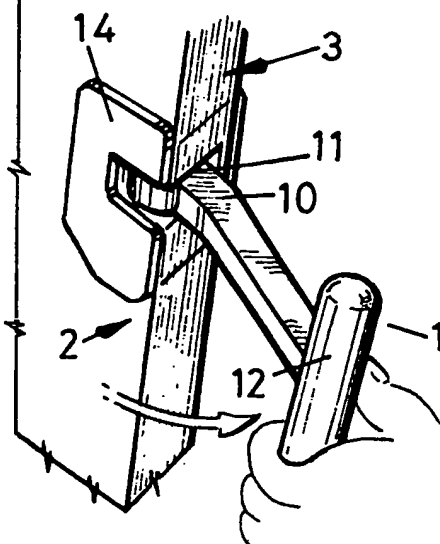


FIG. 1A

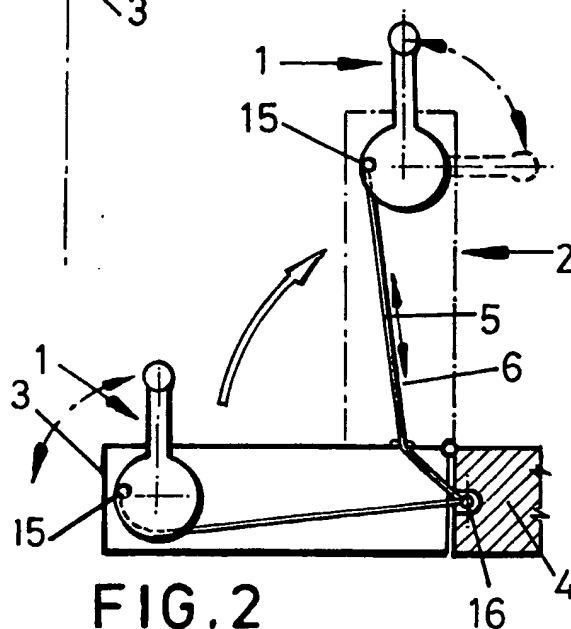


FIG. 2

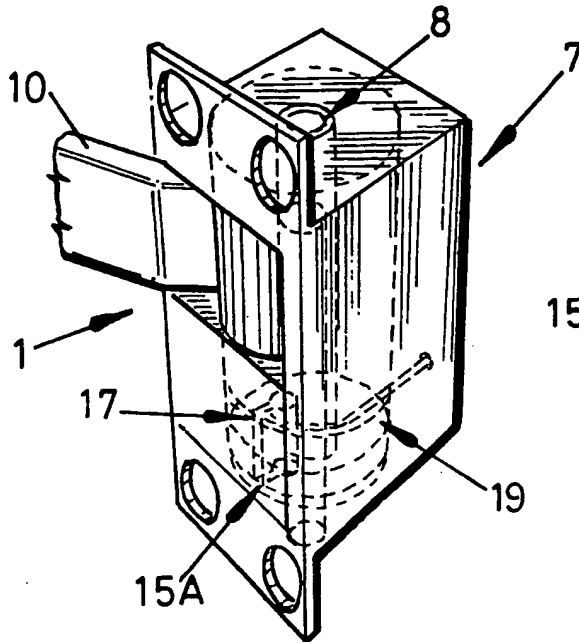


FIG. 3

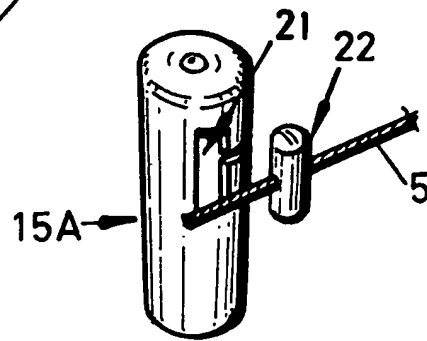


FIG 5

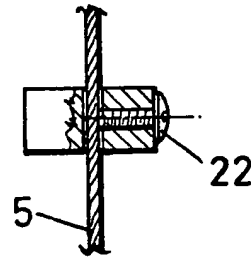


FIG. 5A

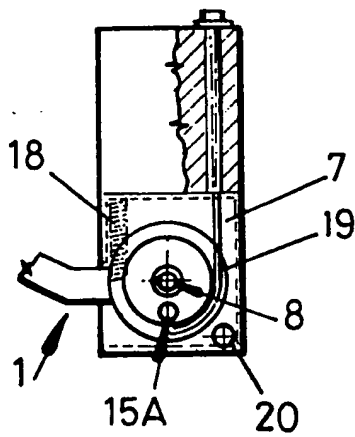


FIG. 4

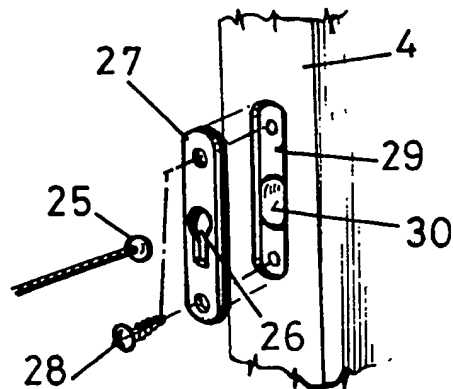
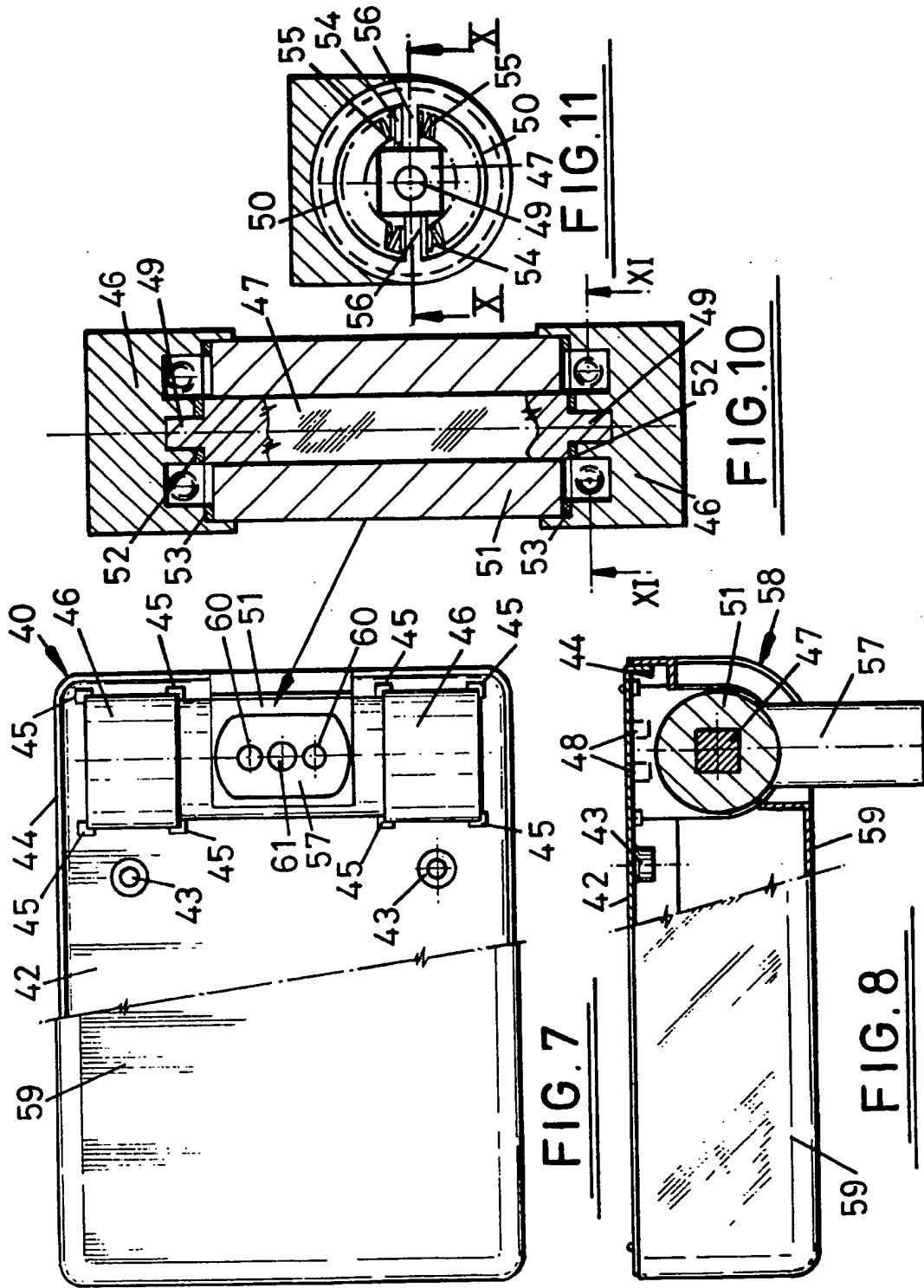


FIG. 6



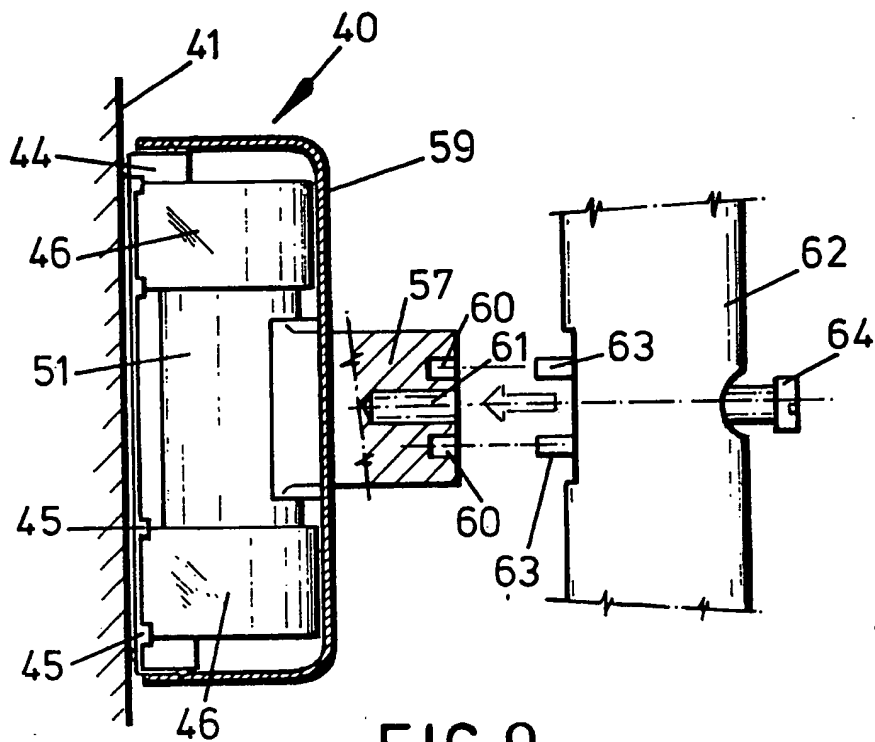


FIG. 9

## SPECIFICATION

## A door handle arrangement

5 The present invention relates to a door handle arrangement, and in particular to a door pull handle arrangement.

10 When a door is pulled open, the line of force acts through the body, with the pulling action performed by frequently used muscles in the shoulder and the arm. However once the door has reached a certain position, the line of force ceases to act through the body with the result that the moment of the force about the shoulder is greater, in addition to which the muscles performing the movement at this stage tend to be less frequently used muscles in the back and shoulder blades. This is particularly disadvantageous in the case of heavy doors (for example fire doors) and where movement is restricted (for example in a corridor or in the case of a disabled person).

25 A further problem associated with pulling a door open is that when the door is fully opened the handle often tends to come into contact with a wall. This not only renders the handle and the wall liable to damage, but also renders the hand of the person opening the door vulnerable, and, in the case of contact between the handle and the wall leaves the handle useless in its capacity as a handle.

30 A further disadvantage of existing door handle arrangements is that as a person moves through the door their wrist becomes impeded by the door if they are still holding the handle. This problem is most noticeable when the door is to be kept open for a few moments, and is particularly acute in the case of anyone who is wheelchair bound, as the door has to be kept open manually, and as the wheelchair user is often restricted to using one hand for this they frequently end up holding the door by its edge or throwing the door open and racing to pass through before it closes. The latter method is often impossible anyway if the door is particularly heavy or fitted with a door closer.

45 One way of dealing with some of the above problems has been to provide door handles with extending vertical bars which may be pushed with the elbow, but this does not deal with the abovementioned leverage problems, and the handle is still obscured as mentioned above.

50 The object of the present invention is to obviate or mitigate the abovementioned problems.

55 According to the present invention there is provided a handle arrangement adapted to be secured to a door adjacent the opening edge thereof and comprising a handle adapted for pivotal movement about an axis parallel with the hinge line of the door between a first position extending outwardly from the face of

the door when the latter is closed and second position aligned with the plane of the door when the latter is opened, and biasing means connected to the handle for returning the latter to the first position from the second position upon closing of the door.

The present invention will now be described by way of example, with reference to the accompanying drawings, in which:

75 *Figure 1* is a perspective view of an embodiment of the pull handle arrangement of the present invention with the handle normal to the door;

80 *Figure 1A* is detail of a view corresponding to Fig. 1 with the handle rotated towards the plane of the door;

*Figure 2* is a diagrammatic representation of the handle arrangement viewed in the direction of the arrow A of Fig. 1, with the door in its closed and open positions;

85 *Figure 3* is a fragmentary perspective diagrammatic view of the handle within its casing;

90 *Figure 4* is a fragmentary sectional view in the direction of the arrow A of Fig. 1, of the handle and casing within the door;

*Figures 5 and 5A* are respectively a perspective detail view and a sectional detail view of an adjustable anchor for the cable in the casing;

95 *Figure 6* is a perspective detail view of means for anchoring the cable to the door frame;

100 *Figure 7* is a front view of an alternative and preferred handle arrangement;

*Figure 8* is a corresponding, part-sectional, plan view of the Fig. 7 handle arrangement;

*Figure 9* is a corresponding, part-sectional view of the Fig. 7 handle arrangement;

105 *Figure 10* is a sectional view on the line X-X of Fig. 11; and

*Figure 11* is a sectional view on the line XI to XI of Fig. 10.

Referring to Figs. 1 and 2, a handle arrangement 1 is fitted to a door 2 adjacent the opening edge 3 thereof and includes a handle pivotal between a position normal to the door (door closed) to a position aligned with the plane of the door (door open), the handle being connected to the frame 4 of the door by a cable 5 extending through a bore 6 formed in the door 2, and being biased to the door closed position.

120 The handle arrangement comprises a casing 7 fitted into the structure of the door 2 at its opening edge 3, which casing 7 houses a bearing spindle 8 (Figs. 3 and 4) rotatably mounting a sleeve 9 to which the handle is connected. The handle comprises a connecting limb or bar 10 secured to, or integral with, the sleeve 9 and extending normally, or substantially so, to the door 2, the casing 7 and door edge 3 each being formed with a cut-out 11 for this purpose. The handle also comprises a gripping limb or bar 12 connected to,

or integral with, the limb or bar 10 and disposed at right angles thereto.

The casing 7 houses the bearing spindle 8, and the cut-outs 11 are such that the handle 9, 10, 12 can be rotated through 90° to lie in the plane of the door when the latter is open (see Fig. 2).

The handle arrangement 1 is completed by external and internal touch plates 14, one on either side of the door 2.

Referring to Fig. 2, the cable 5 is anchored to the sleeve 9 as indicated at 15, and is anchored to the door frame 4 as indicated at 16, the cable 5 extending through the bore 6 in the door.

An anchoring pin 15A for the cable 5 is located in a slot 17 in the sleeve 9, and a spring 18 for biasing the handle 9, 10, 12 to its door closed position being connected at one end to the sleeve 9 and at the other end to the casing 7. The cable 5 engages in a recess 19 around the circumference of the sleeve 9. A stop member 20 (see Fig. 4) is provided at the edge of the cut-outs 11 adjacent the inner face of the door 2 to limit rotation of the handle 9, 10, 12 upon door opening.

The cable anchoring pin 15A has a T-slot 21 in which the cable 5 is secured by screw 22. The screw 22 may be loosened, adjusted along the cable 5, and retightened to adjust the length of the cable 5 and take up slack.

Fig. 6 shows a means for anchoring the cable 5 to the door frame 3. A solder ball 25 on the end of the cable 5 fits through a key-hole slot 26 in an anchor plate 27, which is attached by screws 28 to a recess 29 in the door frame 4, which recess is provided with a hole 30 to house the solder ball.

As the door 2 is opened tension in the cable 5 due to the increasing gap between the bore end (Fig. 2) and the door frame 4 assists in pulling the sleeve 9 round so that the handle 1 moves away from the hinge line to abut the stop 20 where the connecting limb 10 extends in the plane of the door when the door is fully opened. When the door is closed the handle 1 is returned to a position in which it is normal to the plane of the door by the spring 18.

Referring now to Figs. 7 to 11, the preferred handle arrangement 40 is face mounted on a door 41 and comprises a fixing plate 42 screwed to the door 41 via mounting holes or bushes 43. The fixing plate 42 has an outwardly directed peripheral flange 44. The backing plate 42 is also provided with two vertically spaced sets of mounting formations 45 which locate retainers 46 for a spindle 47. The retainers 46 have blind holes 48 whereby they can be fixed, for example by screws, to the fixing plate 42.

The spindle 47 is of square section save for its ends 49 which are circular. These ends 49 engage in circular blind holes in the retainers

46 disposed centrally between arcuate recesses 50.

A sleeve 51 with a square bore is non-rotatably fitted onto the spindle 47. A bearing washer 52 is disposed between each end of the spindle 47 and its respective retainer 46, and a bearing washer 53 is disposed between each end of the sleeve 51 and its respective retainer 46.

At each end the sleeve 51 has two offset flanges 54, one at each side of its square bore, which flanges 54 extend into the respective arcuate recess 50. A spring 55 is disposed between each flange 54 and a central rib 56 of each retainer 46, which ribs separate the arcuate recesses 50.

These springs 55 constrain the sleeve 51 into a position where a connecting bar or limb 57 extends normally to the face of the door 41.

This connecting bar 57 is connected to, or is integral with, the sleeve 51 and extends out of a right-angled cut-out 58 in a front casing 59 of the handle arrangement 40. This casing 59 engages over the flange 44 of the fixing plate 42 and is secured thereto in any convenient way, for example screwing or a snap fit.

The front face of the connecting bar 57 is formed with blind locating holes 60 and a screw-threaded bore 61 to permit a convenient gripping handle 62 of any desired configuration to be secured to the connecting bar 57 by means of locating pegs 63 and a fixing screw or bolt 64.

The handle arrangement 40 functions in substantially the same manner as the handle arrangement 1 save, in this instance, no tensioned cable is provided between the sleeve and the door frame.

The springs 55 act to return the handle 51, 57, 62 from the door open position (handle aligned with plane of the door) to the door closed position (handle normal to the door).

## 110 CLAIMS

1. A handle arrangement adapted to be secured to a door adjacent the opening edge thereof and comprising a handle adapted for pivotal movement about an axis parallel with the hinge line of the door between a first position extending outwardly from the face of the door when the latter is closed and second position aligned with the plane of the door when the latter is opened, and biasing means connected to the handle for returning the latter to the first position from the second position upon closing of the door.

2. A handle arrangement as claimed in claim 1, comprising a casing rotatably mounting a sleeve forming part of the handle, the casing being adapted to be mounted on the door adjacent the opening edge of the latter and having a right-angled cut-out or opening through which the pivotal handle extends.

3. A handle arrangement as claimed in

claim 1 or 2, in which the biasing means comprises one or more springs connected between the pivotal handle and a stationary part of the door handle arrangement, the spring or  
5 springs urging the handle to the first position.

4. A handle arrangement as claimed in any one of claims 1 to 3, adapted to be face mounted on a door.

5. A handle arrangement as claimed in  
10 claim 1, comprising a casing adapted to be mounted within a door structure at the opening edge thereof, which door structure has a face/opening edge cut-out to permit pivotal movement of the handle which is pivotally  
15 mounted in the casing.

6. A handle arrangement as claimed in claim 5, in which a tension cable is adapted to connect the pivotal handle with the door frame at the hinge side of the door, which  
20 cable assists movement of the handle from the first position to the second position upon door opening.

7. A handle arrangement as claimed in claim 5 or 6, in which the biasing means is a  
25 spring connected between the handle and the casing.

8. A handle arrangement as claimed in claim 6 or 7, in which the cable is length adjustable.

30 9. A handle arrangement adapted to be secured to a door adjacent the opening edge thereof, substantially as hereinbefore described with reference to Figs. 1 to 6 or Figs. 7 to 11 of the accompanying drawings.